FLACS SOFTWARE

FLACS Software is focusing on producing and distributing a complete and advanced, well validated and recognized software solution for CFD modeling in ventilation, dispersion, explosion and fire. FLACS CFD-Tool allows to simulate scenarios of high and low momentum and multi-phase releases, gas explosion and fire in complex geometry providing a realistic impression of the events and valuable information on the consequence side.
In order to make the best of FLACS capabilities, FLACS Software Group is actively supporting FLACS users from the first introduction to FLACS software, to the advanced use of the code and ways of applying the tool functionalities and utilities to various applications and developing methodologies with regard to ventilation, dispersion, explosion and fire analyses, including increased awareness on phenomena observed during accident investigations and experiments.

FLACS Training Group is thus providing a comprehensive development path for FLACS Users, from Beginners up to the Expert level, including Management Level and Decision Makers, to understand cost/pricing, project management including CFD work, guidance, Quality Assurance and requirements, standards requirements, risk management, added values expected when performing analysis with FLACS to support design choices from screening to details solutions.

This training program allows participants to come up the learning curve quickly and supports their project work. The training can be given “in-House” on requests.
Targets

Management Level
Understand and highlight added values and potential improvement provided by FLACS CFD analysis in projects (from Concept to EPC and, furthermore, through modifications and operations) with regards to cost efficient solutions and risk management.

• QA/QC – peer-review
• pricing of studies – cost efficient solutions and optimizations
• increased awareness and competences in evaluating CFD (FLACS) work provided by engineering companies or consultants.
• Decision making

Advanced/Expert FLACS Users
More efficient access and use of utilities for optimization of FLACS work and enhanced post-processing capabilities in FLACS applied to specific applications and cases studies

• QA/QC – peer-review
• Methodology development
• Sensitivity studies
• Data export to FEA tools (structural and fire analysis)
• Congestion modelling – evaluation, requirements and methodology
• Scripting

Beginners/Basic FLACS Users
Mandatory basic training introducing FLACS models and validation, as well as FLACS philosophy and how to define scenario and run FLACS Simulations.

• setting up, running and extracting results for a basic range of typical gas dispersion and gas explosion scenarios
• FLACS user guidelines for defining scenarios to ensure accurate and validated results
• QA results their own work

Find more on our website (http://www.flacs.com) and contact Ronan (ronan@gexcon.com)
PREREQUISITES FOR ATTENDING THE COURSES

Almost all courses are suitable for completely new users of FLACS as well as users who would like to refresh their knowledge. In general, no special prerequisites are required, but any prior knowledge in safety consequence modeling, CFD models or 3D modeling will in general be helpful.

For attending the FLACS II Advanced Training, FLACS I attendance is mandatory. Other prerequisites are: 6 months/1 year min experience in FLACS use on industrial applications; prior knowledge in safety consequence modeling; use of CFD tools and experience on 3D modeling.
This course is an introduction into the theory and mechanisms in gas explosion and to the concepts and models within FLACS v10. It covers all typical areas of consequence modeling within the software, including ventilation, gas dispersion, gas explosions and mitigation measure (e.g. water deluge, vent panels).

This course combines both theory and practical exercises with the FLACS v10 software; therefore, students are required to practice and apply their new knowledge of the software through extensive hands-on workshops.

4-DAY COURSE
The agenda includes time for questions & answers, breaks and lunchtime

DAY 1
- Introduction: GexCon, Explosions & FLACS
- FLACS Runmanager
- Coffee / Questions and Answers
- FLACS preprocessor CASD: Scenario definition
- Exercise I: Explosion in test rig
- FLACS postprocessor FLOWVIS: Visualizing results
- Exercise T1 - r1file tool: exporting exercise I results into an Excel spreadsheet
- Mitigation of explosions
- Exercise III: Explosion mitigation

DAY 2
- FLACS preprocessor CASD: Geometry building/grid/porosities
- Exercise II: Build geometry, calculate blast waves from explosion
- CAD import
- Exercise T2: importing a .dgn file with geo2flacs tool

DAY 3
- Validation testing and procedures for CFD
- Ventilation and dispersion
- Exercise IV: Dispersion/explosion calculation in offshore geometry
- Efficient use of FLACS and QA

DAY 4
- Pool spread
- Exercise V: Pool spread simulation
- Efficient use of FLACS and QA
- Explosion Risk Analysis
- FLACS Fire
- Exercise VI: Jet and pool fire simulations
This course is an introduction into the theory and to the concepts and models within FLACS-Fire. It will focus on the FLACS-Fire modelling capabilities, including jet fire, pool fire, “solid flame” and radiations models.

HALF-DAY COURSE

- Introduction
- FLACS Fire applications
- FLACS Fire modelling capabilities
- Setting up FLACS pool and jet fire simulations
- Post processing
- Computational requirements
- Troubleshooting fire simulations
- EXERCISES - Fire study on an offshore module
- Creating jet fire scenarios using and existing geometry, grid and porosity files.
- Creating pool fire scenarios using an existing geometry
There are a range of FLACS code capabilities not fully covered in the introductory FLACS I course program. An additional 2-days course is proposed for advanced applications and modeling. The course format is a library of modules that match advanced exercises and relevant presentations; the duration of a module is approximately 2.5 hours.

**2-DAY COURSE**

the agenda is typically composed by 6 modules and includes time for questions & answers, breaks and lunchtime; the course program can be adjusted according to Clients' requests.

Modules (presentation + exercise) currently proposed are:
- Anticipated Congestion modeling (AC)
- Blast load and structural response
- Gas detection systems optimization
- HVAC systems modeling

Additional modules and topics (a couple can be added according to clients’ requests):
- V10 and more: Update on more recent features (for old FLACS users)
- Vessel burst, impulsive (TNT type) blast loading
- Miscellanea of advanced features (using setup/cc file)
- Advanced post-processing (using r3file/a3file)
- Flash and Pool: How to define release models
- Full ventilation/dispersion/equivalent gas cloud/explosion exercise
- Advanced exercises using a real case geometry (if available/proposed by a client)
- Wind modeling (*) Modules 3 and 6 can be redefined/rearranged according to Clients’ requests
DustEX COURSE

This course is an introduction into the theory and mechanisms in dust explosion and to the concepts and models within FLACS. It covers all typical areas of consequence modelling within the software dealing with dust explosions, including modeling dust layers, events and mitigation measure (e.g. vent panels).

2-DAY COURSE
• Introduction: GexCon, Explosions & FLACS – FLACS DustEx
• Constructing internal geometries
• Working with databases, geometries and objects
• Defining and verifying the computational grid
• Calculating and verifying porosities
• Analysing data from 20-litre explosion vessels
• Defining dust explosion scenarios
• Running simulations
• Analysing results
• Verifying results
FLACS-PROB COURSE

A short course on probabilistic approach to Risk Assessment for decision makers and analysts. At the end of the course, delegates should achieve the following key learning outcomes:

• Provide basic understanding of worst case, realistic worst case and probabilistic approach for risk assessment

• Outline a risk analysis methodology according to NORSOK Z-013 Standard

• Fill the gap between CFD application and risk management needs

2-DAY COURSE

• Introduction and motivation
• The Norsok Z-013 Standard
• Motivation for using CFD for effects evaluation
• Probabilistic risk analysis with CFD
• Ventilation simulations
• Dispersion simulations
• Ignition modeling
• Explosion simulations
• Risk calculation
FLACS-GEO COURSE

A practical course for CAD engineers and analysts on how to properly develop a geometrical modeling task for FLACS applications. A special chapter is dedicated to the assessment of the congestion level and the geometry enhancement according to an Anticipated Congestion concept. 

Main topics are:

- Developing and handling complex geometries for FLACS applications
- Assessing the congestion level
- Improve the geometry definition by means of Anticipated Congestion Method

2-DAY COURSE

The agenda includes time for questions & answers, breaks and lunchtime

DAY 1

- Exercise 1: Make Classroom model
- Presentation 2: Geometry modelling
- Exercise 2: Make Vessel object using left difference
- Presentation 3: Tips and tricks, how to model smart
- Exercise 3: Make Pump object using background drawings
- Presentation 4: Import & cleanup
- Exercise 4: Importing a complex geometry (Browse)

DAY 2

- Presentation 5: Anticipated Congestion (AC)
- Exercise 5: Design and implement AC on a geometry module
- Presentation 6: QA and Model Documentation
- Questions; Repeat/recover missed items
FLACS JUMP START

Your team is challenged tight project deadlines. We can provide you and your team with a tailor made training program to jump on the project and quickly come up the learning curve and meet your project deadlines.

**DURATION:** On request

**COURSE TYPE:** Lessons - Workshop - Mentoring sessions - Online follow-up - Quality check

**LEARNING OBJECTIVES:**
- Quickly come up the learning curve & meet your project deadline,
- Scope and milestones definition for FLACS Simulation work throughout the project plan
- Milestones Support before each FLACS simulation phase
- Quality Check at each milestones and in the end of the project
- Making sure that the each simulation phase receives proper input
- Making sure the project schedule is followed without any hiccups
- Ensuring the quality of the FLACS work
- Support in clients meeting is required

**CONTENT:**

[Diagram showing content flow: Project plan definition, Requirements, Resources, Geometry, work, Project Start, Phase #1, Simulation work, Phase #2, Simulation work, Delivery, Support when, comments, Lessons Learned, Client meeting]
FLACS MENTORING

Your team is challenged by specific problems or applications. An expert on the subject matter can assist you and/or your team with overcoming the challenges with success by using FLACS.

**DURATION:** On request

**COURSE TYPE:** Lessons - Workshop - Mentoring sessions - Online follow-up - Quality check

**LEARNING OBJECTIVES:**
- Support your teams exposed to sensitive and specific challenge regarding simulations work and modeling

**CONTENT:**
- Training
- Quality check
- Assistance
- Support on a specific problems or applications